REMARKS/ARGUMENTS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 17-42 are pending in the application. Claims 1-16 are canceled; and Claims 17-42 are added by the present amendment. Support for the new claims can be found in the original specification, claims and drawings.[1] Thus, no new matter is presented.

In the outstanding Official Action, the specification was objected to because of minor informalities; and Claims 1-16 were rejected under 35 U.S.C. § 103 (a) as unpatenable over Dabak et al. (U.S. Patent No. 6,728,302, hereinafter "Dabak") in view of Agrawal et al. (U.S. Patent No. 6,618,454, hereinafter "Agrawal").

In response to the objection to the Specification, p. 2, line 34 and p. 3, line 8 of the specification are amended to remove the reference to specific claim numbers. Accordingly, Applicants respectfully request that the objection to the specification be withdrawn.

In response to the rejection based on Dabak and Agrawal, Applicants respectfully submit that new independent Claims 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39 and 41 state novel features clearly not taught or rendered obvious by the applied references.

The new independent claims are directed to a wireless orthogonal frequency division multiplex (OFDM), communication system having multiple (at least a first and a second) transmission antennas. The system enables transmission of data in both the time and frequency domains (i.e., in frequency subcarriers and timeslots), and includes a first antenna for transmitting a first data stream and a second antenna for transmitting a second data stream. As recited in the pending independent claims, first pilot symbols (first type pilot symbols) are transmitted via the first antenna and second pilot symbols (second type pilot symbols) are transmitted via the second antenna. Thus, the first pilot symbols (first type pilot

[1] e.g., specification, original Claims 1-16 and p. 9, lines 17-19, for example.

symbols) are transmitted among the data of the first data stream (i.e. are dispersed or allocated at various positions in between the data of the first data stream), and the second pilot symbols (second type pilot symbols) are transmitted among the data of the second data stream (i.e., dispersed among the data of the second data stream). The first and second pilot symbols (first and second type pilot symbols) have the same frequency and time allocation and a regular distribution in the time and frequency dimension in OFDM system. Therefore, the first pilot symbols (first type pilot symbols) are dispersed among the frequency subcarrier and timeslot grid of the OFDM system, whereby the respective frequency subcarrier/timeslot allocation the first pilot symbols (first type pilot symbols) corresponds to the frequency subcarrier/timeslot allocation of the second pilot symbols (second type pilot symbols). Further, some of the first pilot symbols (first type pilot symbols) are orthogonal (or inverted) to the corresponding second pilot symbols (second type pilot symbols). Other first pilot symbols (first type pilot symbols) are identical to the corresponding second pilot symbols (second type pilot symbols) in the same frequency subcarrier/timeslot allocation.

It is to be noted that the specific allocation and choice of pilot symbols in the frequency dimension as well as in the time dimension according to the present invention enables a reliable channel estimation in cases of high Doppler frequencies as well as high channel dispersion. In this context, it is to be noted that the specific allocation in choice of pilot symbols according to the present invention is not restricted and limited to space time diversity (STTD) schemes.

The basic requirements for a *prima facie* case of obviousness are (1) there must be some suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the reference or to combine the reference teachings, (2) there must be a reasonable expectation of success, and (3) the prior art reference must teach or suggest all the claim limitations. It is respectfully submitted that

the applied references to make a *prima facie* case of obviousness, because neither Daback, nor Agrawal, neither alone, nor in combination teach or suggest all the elements recited in new independent Claims 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39 and 41.

Specifically, new independent Claim 17 recites, *inter alia*, a transmitting device for transmitting signals in a OFDM communication system with multiple transmission antennas, comprising:

> ...generating first and second pilot symbols to be transmitted among said data of said first and second data stream, wherein first pilot symbols are transmitted via said first antenna and second pilot symbols are transmitted via said second antenna,
> wherein said first and second pilot symbols correspond to one another and have the same frequency and time allocation and a regular distribution in the time and frequency dimension in the OFDM system,
> and wherein pairs of first pilot symbols adjacent in the frequency dimension are respectively orthogonal to corresponding pairs of second pilot symbols and pairs of first pilot symbols adjacent in the time dimension are respectively orthogonal to the corresponding pairs of second pilot symbols.

Independent Claims 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39 and 41, while directed to alternative embodiments, recite substantially similar subject matter. Therefore, the arguments presented below also apply to these independent Claims.

Turning to the applied primary reference, Dabak describes a space time transmission diversity scheme in which pilot symbols are transmitted via a first and a second antenna. Table 1, at col. 3 of Dabak shows a scheme in which pilot symbols B1, S1, B2 and S2 are transmitted in every single succeeding timeslot via each of the antennas.

Thus, Dabak fails to teach or suggest a scheme in which pilot symbols are transmitted among a data stream. Further, Dabak fails to teach or suggest a scheme in which the pilot symbols are arranged in the frequency dimension and the time dimension among a data stream as defined by the present claims. Specifically, Dabak fails, at any point, to teach or suggest the transmission of pilot symbols in an OFDM communications system, whatsoever.

Agrawal, the secondary reference, describes a space time and frequency diversity scheme in combination with an OFDM system. In Agrawal, symbols are transmitted over different antennas, however, each antenna transmits symbols in each frequency sub-band in any given timeslot. Thus, the symbols are encoded in order to provide diversity.

However, Agrawal fails to teach or suggest the transmission of pilot symbols, whatsoever. Further, Agrawal fails, at any point, to teach or suggest arranging pilot symbols among data in a data stream in order to obtain a reliable channel estimation for a high channel dispersion as well as for high Doppler frequencies.

Accordingly, Applicants respectfully submit that new independent Claims 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39 and 41 state novel features clearly not taught or rendered obvious by the applied references.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 17-42 is definite and patentably distinguishing over the applied references. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of the application is therefore requested.

Respectfully submitted,

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